

ARGUMENTS FOR A UNIFIED TREATMENT OF Y-INITIAL AND VOWEL- INITIAL ROOTS IN OLUTSOOTSO ¹

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Introduction:

This paper will examine and discuss the surface alternations of y-initial roots and vowel(henceforth V-) initial roots in the Olutsootso dialect of Oluluyia, a Bantu language spoken in the area northeast of Lake Victoria in Kenya. It will be argued that the historical development, and various facts of the synchronic situation indicate that a unified treatment of these roots is justified.

1. Y-initial roots

Let us first examine some y-initial roots in nasal and non-nasal environments. In (1) some nouns of the 9/10 class of Olutsootso are listed. This class is often called the "nasal class" because its prefixes frequently end in a nasal in various Bantu languages. The diminutive forms for these roots are given in order to demonstrate what the underlying forms for these roots are. The diminutive prefix, /axa/, ends in a vowel; this allows the underlying initial segment to surface unaffected by nasal interactions.

(1)	class 9	class 10	diminutive	root	gloss
	singular	plural	singular		
	/iN-/	/tsiN-/	/axa-/		
	inzofu	tsinzofu	axayofu	yofu	elephant
	inzushi	tsinzushi	axayushi	yushi	bee
	inzoxa	tsinzoxa	axayoxa	yoxa	snake

The data from this group suggest that a rule taking y to z if a nasal precedes be postulated. This rule is not phonetically unmotivated or unknown: South American Spanish has a similar rule taking y to z if a nasal precedes, as in (2):

(2): /en yeso/ ---> 'en^zeso' 'in plaster, in a cast'

Some y-initial roots, however, surface with a palatal nasal, not nz:

(3)	iñani	tsiñani	axayani	yani	baboon
	iñaanga	tsiñaanga	axayaanga	yaanga	day
	iñuundo	tsiñuundo	axayuundo	yuundo	hammer
	iñaanza	tsiñaanza	axayaanza	yaanza	lake, ocean

We will note that a palatal nasal surfaces just in case a nasal is found in the next syllable. The loss of a consonant in the first of two nasal clusters is an historical rule in Bantu known as the Ganda Law²; the appearance of n̄ is probably governed by the synchronic reflex of that law. But however the n̄ is to be derived, it is from underlying sequences of /...N-y V N.../.

Other morphological contexts show the y/nz/n̄ alternation. In (4) a y-initial adjective is given which surfaces in non-nasal and nasal contexts:

(4)	Non-nasal	Nasal
	/omu-ndu omu-yiinda/	/iN-taBa iN-yiinda/
	pfx-person pfx-rich	pfx-tobacco pfx-rich
	'omundu omuyiinda'	'indaBa iñiinda'
	'a rich person'	'rich tobacco'

A palatal nasal surfaces as expected.

In (5), we find that y-initial verb roots also show a y/nz/n̄ alternation. In the simple infinitive, the y's surface unchanged; but when prefixed by a nasals /N/, 'me', or /eN/, 'I', we find nz or n̄ surfacing:

(5)	Simple inf.	Pfxed-Inf.	Subj.pfx.	Root	Gloss of root
	/oxu-y.../	/oXU-N-y... ³ /	/eN-y...anga/	/y..../	
	oxuyaBila	oXUnzaBila	enzaBilanga	yaBila	bury
	'to bury'	'to bury me'	'I bury'	bury	
	oxuyeenga	oXUñeenjela ⁴	eneenganga	yeenga	brew
	'to brew'	'to brew for me'	'I brew'	brew	

Thus, we have found evidence from a number of morphological contexts for the y/nz/n̄ alternation; n̄ surfaces when a nasal is in the next syllable; otherwise nz appears from underlying sequences of /N-y.../.

2. V-initial roots:

We will examine next the alternations of V-initial roots when nasals

and non-nasals are prefixed to them. Some examples of these are nouns of the 11/10 class listed in (6). The prefix of class 11 is /olu-/, while that of class 10 is /tsin/. A rule of glide formation and compensatory lengthening has applied in the class 11 forms, making the initial vowel of the root appear long. The diminutive form shows that the vowel is actually short⁵:

(6)	class 11	class 10	diminutive	root	gloss
	olvaala	tsinzala	axaala	ala	finger
	olwiika	tsinzika	axeeka	ika	horn
	olwiimbo	tsinimbo	axeembo	imbo	song
	olweembe	tsinembe	axeembe	embe	razor

The second column shows that when a nasal is prefixed to V-initial roots, a z shows up between the nasal and the vowel of the root. The last two entries of that column show that when a nasal is prefixed to a V-initial root, a palatal nasal sometimes surfaces.

There are other morphological contexts in which this alternation appears. In (7) we find that V-initial adjectives surface with z or a palatal nasal when a nasal is prefixed.

(7)	Non-nasal prefix	Nasal prefix
	/omu-ndu omu-uchi/	/iN-Baatsi iN-uchi/
	pfx-person pfx-sharp	pfx-axe pfx-sharp
	'omundu omuuchi'	'imbaatsi inzuchi'
	aa sharp person'	'a sharp axe'

and

/aBa-ndu aBa-angu/	/iN-taBa` iN-angu/
pfx-person pfx-light	pfx-tobacco pfx-light
'aBandu aBaangu '	'indaBa iNangu'
'light people'	'light tobacco'

And in (8) we find that when V-initial verb roots are prefixed by a nasal, we find a z or a palatal nasal surfacing:

(8)	Simple Inf	Pfx-ed Inf.	Subj.Pfx.	Root	gloss
	/oxu-V.../	/oXU-N-V.../	/eN-V...anga/	/-V.../	

oxwaaBula	oXUnzaBula	enzaBulanga	aBula	split
to split	to split me	I split		
oxwiiBa	oXUnziBa	enziBanga	iBa	steal
to steal	to steal me	I steal		
oxuumbaxa	oXUñumbaxa	eñumbaxanga	umbaxa	build
to build	to build me	I build		
oxweenga	oXUñenjala ⁴	eñenganga	enga	ripen
to ripen	to ripen on me	I ripen		

The V-initial roots show a clear pattern when prefixed by a nasal.

Underlying /N-V.../ shows up as nzV except when a nasal also follows the vowel; then underlying /N-VN.../ shows up as -nVN... This pattern is of course identical to the pattern y-initial roots exhibited when prefixed by a nasal. It seems reasonable to suppose that these two groups of alternations are related to each other. We shall examine the historical situation and various other synchronic facts to argue that this is indeed the case, and that the grammar should treat these roots in a similar manner.

3. Diachronic development:

One reason that y-initial roots and V-initial roots behave similarly might be because they are reflexes of a single root type. Some correspondences between proto-Bantu *gamma-initial (henceforth *g-initial) roots⁶ and synchronic V-initial roots of Olutsootso are listed below:

(9)	Meinhopf/Bourquin proto-Bantu	Synchronic root	Surface forms	Gloss
	<u>g</u> ala	> -ala	olwaala/ tsinzala	finger
	<u>gi</u> Ba	> -iBa	oxwiiBa	steal
	<u>ge</u> li	> -esi	emiesi	moons
	<u>go</u> ki	> -osi	omwoosi	smoke

When *g occurred intervocalically within a morpheme, it became y:

(10)	<u>k</u> ugu	>	kuyu	omukuyu	fig tree
	<u>Be</u> ga	>	Beyi	oBuBeyi	falsehood

The data in (9) indicate that a rule of g > ∅ in root-initial

position should be postulated as part of the historical development. However, there are some cases shown in (11) which were former *g-initial roots and are now synchronic y-initial roots:

- | | | | | |
|------|-----------------|---------|-----------------------------|----------|
| (11) | <u>g</u> ani > | -yani | iñani/tsiñani/axayani | baboon |
| | <u>g</u> ogu > | -yofu | in/tsin-zofu/axayofu | elephant |
| | <u>g</u> uki > | -yushi | in/tsin-zushi/axayushi | bee |
| | <u>g</u> ungu > | -yuungu | iñuungu/tsiñuungu/axayuungu | pot |

These are without exception nouns of the 9/10 Nasal class. Now, nouns of this class occur in their most frequent usages (the normal singular and plural) with a nasal before their roots. In many cases, the nasal prefix neutralizes underlying distinctions. Some examples of this neutralization in Olutsootso are that surface -mb- can be from underlying /N-p/, /N-B/, and /N-h/; similarly, surface -nd- can be from underlying /N-t/, /N-l/, /N-l/⁷ and /N-r/. Such neutralization creates problems in determining the actual underlying segment of these types of clusters. If a child hears the diminutive forms for such roots, he will be able to postulate the same underlying segment as his parents did. But if he does not hear them, he will be forced to "create" an underlying form; this is, then, an area where re-interpretation might be expected.

The import of the above discussion will become clear as we trace the historical development of the *g-initial roots. At the proto-Bantu stage, we can assume that forms existed as in (12):

- | | | | |
|------|--------------------------------------|-------------------|--|
| (12) | class 11/10 | class 3 | class 9/10/diminutive |
| | olu- <u>g</u> ala/tsing <u>g</u> ala | omu- <u>g</u> oki | in/tsin- <u>g</u> ogu/axa <u>g</u> ogu |
- (it will be assumed that the -ng- is the ancestor of -nz-).

At the next stage in history, the rule deleting g in root-initial position enters the language; we shall assume that it followed the nasal interaction rules. Considering for the moment just class 11/10 nouns and class 3 nouns, we would have the situation as in (13). We shall make other assumptions to simplify the presentation but which do not crucially affect the discussion; e.g., that glide formation existed at the time, and that other rules involving the *i vowel have already applied. The simplified situation is presented in (13):

(13)	class 11	class 10	class 3
U. R.	/olu <u>g</u> ala/	/tsiN <u>g</u> ala/	/omu <u>g</u> osi/
Nasal rules	---	tsinzala	---
<u>g</u> -->∅	olu-ala	---	omu-osi
Surface	olwala	tsinzala	omwosi

Speakers of the next generation have no access to the *g; it has been totally neutralized by the nasal interaction rules and by the g---∅ rule. For nouns of the 11/10 class, speakers are forced to postulate V-initial roots, since the very common singular form, olwaala, shows clearly that the root is V-initial. They would be forced to posit rules taking the underlying sequence of /N-V/ to nz, and in some cases, to n̄.⁸ Speakers have very strong evidence that the roots are V-initial; it consists of the very common singular form, the class 11 form.

There is no such strong evidence for nouns of the 9/10 class, listed in (12). Assuming that their development is essentially similar to the above, the situation would be as in (14):

(14)	class 9	class 10	diminutive
U.R.	/iN <u>g</u> ofu/	/tsiN <u>g</u> cfu/	/axa <u>g</u> ofu/
Nasal rules	inzofu	tsinzofu	---
<u>g</u> -->∅	---	---	axa-ofu
Surface	inzofu	tsinzofu	axoofu

When the next generation encounters these forms, note that they do not have immediate evidence that these roots are V-initial. This is because the singular and plural forms, the normal occurrences, do not provide any evidence that these roots are V-initial. Only if speakers actually hear the diminutive forms will they have any evidence that these roots are V-initial. And, as we mentioned earlier, if speakers do not hear these diminutives, they are forced to "create" them. Apparently, what they created were y-initial forms.

The question immediately arises as to why y's were postulated. Two answers are suggested. One is that y is the only segment which might

produce both nz and n̄ on plausibly phonetic grounds. The other is because of another re-interpretation involving newly-created y-initial roots; we shall next discuss that.

There are *g-initial verb roots which correspond to synchronic y-initial roots. However, as (15) shows, these verbs involve a long vowel in the root:

- (15) *geka > -yeexa to lean
 *ganda > -yaanza to like, love, please

For this discussion, it would not matter crucially whether the lengthening existed originally, or developed later. Assuming that the g → Ø rule applied at some stage to these roots (and that the lengthening had taken place), we would have had long-V-initial roots: -eexa and -aanza. Since nearly every verbal prefix is V-final, an ungrammatical -VVV- sequence would result whenever a root was prefixed. Synchronically, this is not tolerated, and a rule of y-insertion takes care of such sequences.⁹ If such a rule existed historically, it could explain the development of the y for these roots. On the other hand, it is possible that the *g's were not lost before long vowels, and that they later became y intervocally.

What is important is that all along, these roots in (15) have been showing the same alternations as other earlier *g-initial roots which have become V-initial. That is, nz or n̄ shows up for both groups when a nasal is prefixed. At a later stage, the y's in (15) are no longer predictable. With their surface nz/n̄ alternations, they provided a model for the class 9/10 nouns with surface nz or n̄. The class 9/10 nouns could then be analyzed as y-initial.

To sum up the historical development, *g-initial roots at the proto-Bantu stage appeared as g-initial unless a nasal preceded; in which case, the ancestors of nz or n̄ surfaced. When the g's were lost, some roots had to be analyzed as V-initial; when these were prefixed by a nasal, they continued to show up as nz or n̄. A clear example of this would be the nouns of the 11/10 class which were V-initial. A rule deriving nz or n̄ from

underlying /N-V/ had to postulated; the evidence was probably too overwhelming to postulate anything else. But in cases where there was not clear evidence that roots were V-initial, and yet nz or n̄ showed up as the results of some nasal interaction, speakers did not postulate underlying V-initial roots, but chose instead to analyze them as y-initial roots. It is precisely in the 9/10 class that there was no clear evidence that the roots were V-initial.

The re-interpretation was possible because verb roots which had just become analyzed as y-initial were also exhibiting the same alternations when a nasal preceded: nz or n̄. Therefore, re-interpretation took place for nouns of the 9/10 class with surface nz or n̄ as being from underlying /N-y/ too.

Other facts of the historical development support the re-interpretation proposed here. For instance, proto-Bantu V-initial roots in the 9/10 class have been analyzed as y-initial:

- | | | | | | |
|------|--------|---|---------|-------------------------|-------------|
| (16) | *uanga | > | -yaanza | iñ/tsiñ-aanza/axayaanza | lake, ocean |
| | *undo | > | -yuundo | iñ/tsiñ-uundo/axayuundo | hammer |

And semantically related roots from *g surface as V-initial in non-nasal classes, but as y-initial in the 9/10 Nasal class:

- | | | | | | |
|------|---------|---|---------|-----------------------|--------------|
| (17) | *guki | > | -ushi | oBu-ushi | honey |
| | | | -yushi | inzushi/axayushi | bee |
| | *gaanga | > | -angu | omu/emi/li/shi - angu | light (adj.) |
| | | | -yaanga | iñaanga/axayaanga | day(light) |

In fact, the synchronic phonotactics indicate that there are no V-initial roots in the 9/10 class. This means that speakers have simply avoided postulating a rule taking /N-V/ to nz or n̄ if they can help it. They know that nz or n̄ can be from /N-y.../, and unless there is irrefutable evidence that the root is V-initial, speakers will refuse to analyze surface nz or n̄ as being from /N-V.../.

The re-analysis we have seen can be expressed by a rule, perhaps taht of (18):

- (18) $\emptyset \rightarrow y / \underline{\quad} + V$ for nouns and adjectives in the 9/10 class.

But this would be essentially similar to (18'), a rule we will be motivating for the synchronic grammar:

(18') $\emptyset \rightarrow y/N \underline{\quad} V$

Of course, the reason that (18) is so similar to (18') is because in nouns of the 9/10 class, the prefix will always be a nasal; (18') is therefore a generalization of (18) which is a very logical extension of it. The results of the re-interpretation are that:

y-initial roots

V-initial roots

a rule of y-insertion

surface appearances of nz or n̄ from /N + /

have been systematically linked together; indicating that a unified treatment is strongly suggested. The implementation of this unified treatment synchronically will be discussed next.

4. Synchronic Unified Treatment

It will be argued that y-initial roots and V-initial roots should be treated in a unified manner in the synchronic grammar when preceded by a nasal. Specifically, a rule of y-insertion will be postulated for these V-initial roots when preceded by a nasal.

If we don't postulate a rule like (18'), we claim that the derivation of surface nz and n̄ for y-initial roots is totally unrelated to the derivation of nz or n̄ for V-initial roots. Assuming that the derivations of nz and n̄ from a nasal plus underlying y are correct, totally different processes must derive an nz from /N- V/. If the next syllable has a nasal, then n̄ is derived. Of course, neither nz nor n̄ has any phonetic similarity to its underlying source, /N-V/.

The first argument in favor of a rule like (18') is that it helps to account for the identical distribution of nz and n̄ with y-initial roots and V-initial roots. Both groups of roots show essentially similar surface alternations when a nasal is prefixed to them; a grammar with (18') can capture that similarity. In addition, the phonetic implausibility of

deriving nz or n̄ directly from /N-V/ is no longer a problem.

The next point in favor of a rule like (18') is that there are occasional and idiosyncratic deviances in the derivation of nz and n̄. As we saw earlier, the appearance of n̄ was apparently triggered by the prescence of a nasal in the next syllable. In a very few cases, a pronunciation with nz is also possible, although the preferred form still seems to be n̄. This deviation occurs when the nasal in the next syllable is n; there is no deviation when other nasals or a nasal cluster is in the next syllable. In addition, the prescence of n in the next syllable is only a necessary, but not a sufficient, condition for deviance; at the moment, then, there is no way to predict when deviant pronunciations will be marginally allowed. At any rate, a verb like that in (19) shows this apparent pattern:

- | | | | | | |
|------|--------------|-------------|-----|-----------|---------------|
| (19) | oxu-yiinina, | /N-yiinina/ | --> | <u>n̄</u> | iin <u>IA</u> |
| | pfx-remove | | | Nz | |
| | 'to remove' | | | | |
| | | pfx-remove | | | |
| | | 'Remove me' | | | |

Both pronunciations are possible. However this deviation is to be described, it also is part of the derivations of nz and n̄ for V-initial roots also. A V-initial root, /-ana/ 'to moo', when prefixed by a nasal, also has two possible pronunciations:

- | | | | | | |
|------|---------|-----------------------------|-----|---------------------------------|-----------------|
| (20) | oxu-ana | /oXU-N-an-ila/ ^h | --> | oXU ^{n̄} _{nz} | anila |
| | pfx-moo | | | | |
| | oxwaana | | | | 'to moo for me' |
| | | pfx-N-moo-suffix | | | |

But as in the case of y-initial roots, if other nasals or a nasal cluster is in the next syllable, there is no deviancy, and no nz pronunciation is possible.

Thus, there is identical distribution of nz and n̄ when y-initial roots and V-initial roots are preceded by a nasal. And even the deviations in the appearances of these nasals, however they are to be formulated, are in terms of both y-initial and V-initial roots. With a rule of y-insertion, we could account for this development, while without such a rule, we would be claiming that even the variances are accidental between both classes of roots.

Yet another generalization can be captured if a rule of y-insertion before V-initial roots following a nasal is postulated. This generalization involves the synchronic reflexes of the Ganda Law, an historical rule deleting the first stop of two nasal clusters. The synchronic reflexes of that law are seen with l-initial roots, as the examples in (21) show:

- | | | | | | |
|------|--------------|-----------------|-----|------------|--------------|
| (21) | /oxu-leka/ | /oXU-N-leka/ | vs. | /oxu-luma/ | /oXU-N-luma/ |
| | pfx-despise | pfx-me-despise | | pfx-bite | pfx-me-bite |
| | 'oxuleka' | 'oXUndeka' | | 'oxu-luma' | oXUnuma |
| | | | | | *oXUnduma |
| | 'to despise' | 'to despise me' | | 'to bite' | 'to bite me' |

When l is prefixed by a nasal, a rule of nasal hardening results in surface nd, as the example of the root /leka/ shows. But if a nasal is in the next syllable, it seems that a rule deleting the l must be postulated. The first nasal then assimilates to the place of the former l's articulation, becoming alveolar.

Essentially the same type of rule could derive the n̄ from sequences of /N-yVH.../; the y, like the l, is deleted when a nasal is prefixed and when a nasal is in the next syllable, while the first nasal assimilates to the place of articulation of the y, (i.e., the palatal area). It seems therefore that a generalization about certain derived nasal clusters when followed by nasals is possible. Now, when V-initial roots are prefixed by a nasal, the resultant nasal sequence seems to be part of that generalization as well. But without a rule of y-insertion for these V-initial roots, the generalization does not extend to them, since, after all, they would be unrelated phenomena. But if a rule of y-insertion applied to V-initial roots when prefixed by a nasal, then these sequences of /N-y-V.../ could be subject to the same rule(s) that applies to the l and to underlying y when prefixed by a nasal when a nasal occurs in the next syllable. The surface results of the synchronic reflexes of the Ganda Law could be seen as a unified process, and a more comprehensive statement about the language is made than would otherwise be possible.

A stronger argument for a rule of y-insertion before V-initial roots and after a nasal comes from an examination of certain imperative forms. The simple affirmative singular imperative is formed in many cases by taking the root and adding final -a.

(22)	infinitive	root	imperative	gloss
	oxuBaamba	Baamb	Baamba	sacrifice
	oxumeta	met	Meta	Blink
	oxuyaBila	yaBil	YaBila	bury

But for V-initial roots, the imperative is formed by prefixing a y before the root, with a final vowel -a:

(23)	oxwiBa	iB	YiBa	steal
	oxweela	el	Yela	select
	oxwaaBula	aBula	YaBula	split open
	oxwoononia	ononia	Yononia	spoil
	oxuuma	uma	Yuma	dry

A morphological rule of y-insertion for V-initial roots must be postulated:

(24) $\emptyset \rightarrow y / \underline{1} V$ for simple affirmative commands.

When the nasal object prefix, /N/, 'me', is added to these V-initial roots, we get surface nɛ or n̄:

(25)	/N--iB <u>A</u> / ¹⁰	NziB <u>A</u>	Steal me
	/N--el <u>A</u> /	Nzel <u>A</u>	Select me
	/N--aBul <u>A</u> /	NzaBul <u>A</u>	Split me open
	/N--um <u>IA</u> /	N̄um <u>IA</u>	Make me dry
	/N--onon <u>IA</u> /	N̄onon <u>IA</u>	Spoil me

The first-person-prefixed imperative ends in an -a, just like the simple imperative singular. However, all other prefixed imperatives, in singular and plural commands, have a final -e, as in (26):

(26)	class #	object pfx.	/U.R./	surface
	2	Ba	/Ba-Baamb- <u>E</u> /	BaBaamb <u>E</u>
				'Sacrifice them'
	3	ku	/ku-iB- <u>E</u> /	KwiB <u>E</u>
				Steal it

4	chi	/chi-iB-E/	Chi <i>i</i> BE
			'Steal them'

This would indicate that prefixed imperative formation involves two groups: the /N/-prefixed imperatives in (25) and all others as in (26). One way to separate these groups would be to claim that for prefixed imperatives, the rule is simply to prefix the root and add final -e. For the /N/-prefixed imperatives, the rule might be: take the simple affirmative command already formed and prefix the /N/ (while indicating the tonal difference, see footnote 10): For the V-initial roots, the "already formed" imperative is with a y inserted, so the surface form of these /N/-prefixed imperatives is the nz/ñ form. Thus, V-initial roots, y-insertion, a nasal prefix, and surface nz or ñ are systematically linked in that the only imperatives with final -a have had either y-insertion, or surface nz or ñ. The proposed rule of y-insertion for V-initial roots when preceded by a nasal receives support from this paradigm, since here we find evidence that V-initial roots, a prefixed nasal, and y-insertion are parts of the same process deriving surface nz or ñ.

5. Conclusions

It has been argued that surface forms of y-initial roots and of V-initial roots, when prefixed by a nasal, are the results of similar steps in the derivations. It has been claimed that a rule of y-insertion applies to V-initial roots when prefixed by a nasal, so that the rules deriving the surface nz/ñ from underlying nasal plus y can apply to the V-initial roots as well.

We have seen that the historical development of the language indicates that a rule of y-insertion for V-initial roots when prefixed by a nasal must have applied. In the synchronic grammar, it has been shown that a rule of y-insertion for V-initial roots when prefixed by a nasal explains the identical distribution of surface nz/ñ for y-initial roots and V-initial roots. In fact, even the discrepancies in that distribution seemed to be governed by the same factor, in that both y-initial roots and V-initial roots

had the same discrepancy. In addition, certain phonological processes could be stated as generalizations about the language if a rule of y-insertion were assumed. Finally, the imperative paradigm gives evidence that V-initial roots, a prefixed nasal, y-insertion, and surface nz or n̄ are all systematically linked together. To sum up then, a rule like (18') results in the unified treatment of y-initial roots and V-initial roots; a unified treatment that is indicated by the historical development and the synchronic facts.

FOOTNOTES

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2. The Ganda Law has been simply stated: NCVNC NVNC; it has different synchronic reflexes in different languages.

3. The capitalized segments indicate that raised tone and accent are on that syllable.

4. The form given here is actually the applied form of the verb, since the direct object reading is semantically poor.

5. In fact, all V-initial roots seem to be underlyingly short V-initial. If the vowels here were long, we would not get the coalescences as described. The forms in the second column show that the roots are short also.

6. The segment in Meinhopf and Bourquin is the voiced velar fricative. In Guthrie, these are listed as y-initial. The high close vowels are indicated by underlines.

7. The dotted l (l) indicates the voiced alveolar flap.

8. Here we assume that the Ganda Law was in effect.

9. The rule of y-insertion mentioned here applies synchronically when there are sequences of at least three successive vowels underlyingly; this includes

at least at this stage of the investigation, a long vowel and a short vowel, or three underlying morae. There are cases in which a y has been inserted and surfaces although one of the three underlying vowels has been deleted, making the rule opaque; but for this discussion, the rule is not really incorrect as stated, since it does actually exist.

10. The capitalized and underlined vowels in these paradigms indicate that high tone and accent fall on these vowels, and that all preceding tones must be low, although lexically they may have been high.

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